

## GENERAL SAFETY

- **DO** use mechanical aids in preference to direct manual handling of cylinders (ramps, trolleys, forklifts, scissor lifts).
- **DO** remove any connected equipment, eg regulator, AND refit any supplied valve protection cap and or valve outlet gas tight cap/plug prior to moving cylinders.
- **DO** ensure cylinders are positively secured to mechanical lifting/handling devices prior to movement.
- **DO** familiarise yourself with and observe appropriate safe lifting techniques/postures prior to manually handling heavy large gas cylinders.
- **DO** assess the load weight and dimensions before attempting any lift.
- **DO** use suitable personal protective equipment (PPE) – wear safety footwear and leather gloves to protect against falling or slipping cylinders crushing hands or feet during moving.
- **DO** ensure a positive hand grip prior to commencing a manual lift.
- **DO** ensure that loads are equally shared when attempting two person lifts.
- **DO** note environmental conditions prior to handling cylinders – wet, hot or cold cylinders may diminish the quality of hand grip and footing may be compromised.
- **DO NOT** bear hug cylinders to effect a lift.
- **DO NOT** lift or lower cylinders where the operators hands are above shoulder height or below mid thigh height.
- **DO NOT** edge roll cylinders up or down steps of 250mm or greater.
- **DO NOT** edge roll cylinders over discontinuous or soft surfaces.
- **DO NOT** attempt to catch or restrain a falling cylinder.
- **DO NOT** attempt to handle cylinders if you are fatigued, physically compromised or under the adverse influence of medication or alcohol.
- **DO NOT** drop cylinders as a method of transfer – this may seriously damage the cylinder or its valve resulting in their failure and product release.

## PREVENTING INJURY

### When handling heavy or large gas cylinders

#### Risks:

- **Awkward postures**
  - excessive bending and twisting can increase the likelihood of injury.
- **High skeletal forces**
  - loads that are excessive or unexpected can increase the likelihood of injury.
- **Work height differences**
  - moving large cylinders from ground to vehicle or from dock to vehicle may increase the likelihood of injury.
- **Poor hand grip**
  - uncontrolled lifts and insecure grip of load can lead to increased likelihood of injury.
- **Physical capacity**
  - Age, physical condition, gender, medications and alcohol can influence safe cylinder handling.
- **Environmental conditions**
  - Wet conditions, cold or excessive heat may affect safe cylinder handling.
- **High centre of gravity and small base area**
  - Some large high pressure cylinders, e.g. G, E, F & K sizes, have increased instability due to this, especially on uneven surfaces.

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## MANUAL HANDLING HEAVY OR LARGE GAS CYLINDERS in Australia

### Consider this BEFORE handling your cylinders



Think before  
you lift



Don't bear hug  
cylinders



Team lifts share  
the load

## IMPORTANT

Please read the rest of this document fully BEFORE handling large gas cylinders.

(Cylinders weighing greater than 45kg)



Australia New Zealand  
Industrial Gas Association

# CYLINDER HANDLING TECHNIQUES

## Manual handling includes actions such as:

Edge rolling (often referred to as trundling or churning), dragging, sliding, pivoting, unassisted and assisted lifts.

**Edge rolling, trundling or churning** are terms used to describe moving cylinders short distances, usually no more than about 2 metres, by tilting and rolling on the base edge or base ring. It is a technique that requires a high level of coordination and should be restricted to experienced and trained operators.

**Dragging** a cylinder along the ground is NOT a preferred method of movement as it may damage the base and weaken the cylinder. Cylinders fitted with a base rings are also subject to damage from base ring distortion and wear.

**Sliding** a cylinder up or down over a smooth edge should be limited to situations where the operator's hand height remains above that of their standing mid thigh height. It is best employed where transfer distances are small (approx. 200mm) and the operator can avoid bending by transferring the cylinder weight through their legs.

**Pivoting** is a method of lifting tall cylinders a short distance by employing the hip as a fulcrum at the mid point of the cylinder. This practice may result in loss of cylinder control and injury when employed by an inexperienced and untrained person. It is NOT recommended.

**Assisted lifts** allow two operators to share the cylinder load. A two stage, two person lift can be employed to transfer cylinders a vertical distance approx. 50% of the cylinder height. The technique employs a lift/slide action against the edge of the destination platform. The force is applied from the cylinder base. Operators employing this technique should be trained in the practice and co-ordinated in the action.

**Unassisted lifting** of the full cylinder weight should be confined to lighter smaller cylinders.

## Mechanical aids include items such as:

Tailgate lifters, trolleys, ramps, loading docks, scissor lifts and forklifts.

**Tailgate lifters** allow vertical transfer of cylinders from ground level to tray height. Tall cylinders with narrow bases that are unstable should be secured during the transfer to avoid falling. Operators must not ride on tailgate lifters.

**Trolleys/hand trucks** fitted with large diameter pneumatic tyres allow cylinder transfers over short to medium distances e.g. up to 50 metres and over any discontinuous surfaces e.g. gutters, low steps and broken ground. Cylinders must be secured to the trolley or handcart to avoid falling during movement.

**Ramps** provide a continuous surface (suitable for cylinder trundling) between two levels. The ramp surface should be textured to reduce the likelihood of cylinders slipping. The ramp gradient must be small enough to allow for controlled cylinder descent or comfortable ascent and prevent slipping.

**Loading docks** approximate common vehicle tray heights and reduce total cylinder lift distance. Height differences between loading docks and vehicle tray may necessitate raising or lowering cylinders by hand. Note sliding technique as described above.

**Scissor lifts** can be adjusted to vehicle tray height allowing trundling or trolley transfer of cylinders. Cylinders should be secured during the transfer to avoid falling. To assist this, at least a partially caged platform is preferred. People should not ride on scissor lifts.

**Forklifts** can be used to lift cylinders, which are secured in special pallets, directly onto a vehicle or up to its tray height allowing same level transfer of cylinders by trundling directly from pallet to vehicle tray. Cylinders should be secured in pallet during lift.

# TYPICAL CYLINDER WEIGHTS AND DIMENSIONS

The following "Typical" cylinder sizes, dimensions and weights should be noted. They are given purely as a guide. Cylinder weights and dimensions will vary depending on the cylinder manufacturer's specifications and tolerances as well as the cylinder content at the time i.e. full or empty.

**NOTE** the RED area indicates cylinders whose Gross Weight may, depending on their contents, be regarded as Heavy, for manual lifting purposes.

CYLINDER SIZE	NET WT.	HEIGHT (NOTE 1)	OUTSIDE DIAM.	GROSS WT. SIZE (NOTE 2)
	(kg)	(mm)	(mm)	(kg) MAX-MIN
<b>ALUMINIUM CYLINDERS</b>				
G	42	1365	250	74 – 44
F	24	1245	215	46 – 25
E	22	955	215	43 – 29
VT	15	625	215	24
D	10	585	175	17 – 11
C	3	410	117	4 – 3
<b>STEEL CYLINDERS</b>				
EHP	90	1410	233	107 – 103
G	50	1410	229	82 – 53
E	28	910	200	44 – 30
D	11	760	150	18 – 12
C	3 – 5	460	100	5 – 4
<b>ACETYLENE CYLINDERS</b>				
G	50 – 60	800 – 1000	300	64
E	25 – 29	750 – 900	210	33
D	14 – 16	470 – 490	155	15
<b>LOW PRESSURE CYLINDERS</b>				
S	38	1240	375	84
R	28	840	375	99
Q	20	817	310	39
P	10	500	310	36
T	22	813	310	41
N	6.5	400	260	20

**NOTE 1** The height of the cylinders excludes the valve, which can add between 60 and 120mm depending on the valve type, but includes the valve protection ring usually welded to the Low/Medium pressure cylinders.

**NOTE 2** Liquefied gas cylinders e.g. LPG, Carbon Dioxide etc. are considerably heavier than those containing permanent gases such as Oxygen, Nitrogen, Argon etc.

# SAFETY PRECAUTIONS

## Legally

1. An employer must take all practical steps to make sure that the work practices carried out in the workplace are designed to be as far as practicable safe and without risk to health and safety.
2. An employee having received appropriate training in safe manual handling techniques and in the correct use of mechanical aids shall use that training and techniques.
3. Employers should employ a risk control strategy that includes conducting risk assessments.
4. Employees should consult with their employer if they are unclear on aspects of safe manual handling of cylinders.
5. Specific information relating to manual handling is available from the various State Government Departments.

## Disclaimer

The information provided is not intended to replace manual handling training as required by the various state regulatory authorities.

## Reference

1. National Occupational Health and Safety Commission – National Standard for Manual Handling [NOHSC:1001(1990)]; National Code of Practice for Manual Handling [NOHSC:2005(1990)] (NSW, SA, ACT, QLD and TAS)
2. Occupational Health and Safety (Manual Handling) Regulations 1999 (Victoria)
3. Delivering Large Gas Cylinders – A Guide to Manual Handling (WorkSafe Victoria)
4. Occupational Health and Safety (Reg 3.4 Manual Handling) Regulations 1996 (WA)